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ART. 17. REPORTS ON THE MARGARET M. CARY AND
CARNEGIE MUSEUM EXPEDITION TO
BAJA CALIFORNIA, MEXICO, 1961

2. The Family Sphingidae (Lepidoptera)

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[This is the second of a series of papers based on the Margaret M. Cary and Carnegie Museum Expedition to Baja California, Mexico. For an account of the itinerary and description of the localities, see the first paper in this series by Richard M. Fox, Art. 16 in *Annals of Carnegie Museum*, v. 36, pages 181 to 192. Except as noted, all specimens including type series are in the collection of Carnegie Museum.]

The family Sphingidae in Baja California has never before been studied. The present paper deals only with the collections made by the 1961 expedition, mostly by use of moth traps fitted with ultra-violet light (to be described in another paper). When collections are completed for the entire peninsula, the total number of species represented probably will be several times the number listed here. The expedition was in the field during October and November. Nothing is yet known of the sphingid fauna of the spring or summer months.

The expedition brought back 282 sphingids representing 18 species, of which 244 specimens of 14 species were taken on the peninsula. Eight of the species taken in Baja California are widely distributed and occur both in the United States to the north and on the Mexican mainland to the east with no geographic variation. Of the others, *Pachylia syces* is tropical, found on mainland Mexico but not in Western United States, but on the other hand, *Smerinthus cerisy ophthalmica* is a temperate element long known from southern California. It is interesting to find that its range extends to the very tip of the peninsula. The subspecies from the mainland of Mexico is *S. c. saliciti* Boisduval. Our mainland party found four species not taken on Baja California. Two of them are represented there by closely related species but the other two so far are not known to cross the Gulf.

Four new endemic forms were found in Baja California and these are described below. One is a subspecies of the widely distributed *Phlegethontius rusticus*. One is a southern subspecies of *Pachysphinx modesta*, a temperate element. The other two are tropical representatives, one a subspecies of *Hemeroplanes parce*, the other a new species of *Sphinx* which apparently replaces *S. istar*.

The zoögeographic affinities of the sphingids obtained from Baja California Sur are summarized as follows:

- Tropical distribution: 3 species of which 2 are endemic.
- Temperate distribution: 2 species of which 1 is endemic.
- General distribution: 9 species of which 1 is endemic.

Phlegethontius sextus sextus Johannson, 1763.

The specimens found on the peninsula do not differ from those found from Canada to Honduras.

Baja California Sur: La Purisima, 6 ♂ 3-xii. Guaycura Hotel, La Paz, 1 ♂ 20-x, 1 ♂ 22-x, 1 ♀ 29-x, 1 ♀ 31-x (In Cary collection), 2 ♂ 6-xi, 1 ♀ 29-xi, 2 ♂ 4-xii. Bahia de Palmas, 1 ♂ 2-xi, 2 ♂ 12-xi, 1 ♂ 15-xi, 2 ♂ 17-xi (1 in Cary

Submitted for publication, June 27, 1962
Issued December 24, 1963

collection), 1 ♂ 1 ♀ 20-xi. Boca de la Sierra, 1 ♀ 17-xi. Rancho Palmarito, 1 ♂ 20-x, 1 ♂ 4-xi. Puerto Chilena, 1 ♀ 23-xi, 1 ♀ 26-xi. San José del Cabo, 2 ♂, 25-x.

Sonora: Guaymas, 1 ♂ 20-x.

Sinaloa: Five miles west of Concordia, 1 ♀ 28-x. 16 miles north of Mazatlan, 3 ♂ 2-xi.

Phlegethontius quinquemaculatus Harris, 1803.

The two males and one female taken are identical with specimens from the mainland, both in Mexico and throughout the United States.

Baja California Sur: Hotel Guaycura, La Paz, 1 ♂ 28-x. Bahía de Palmas, 1 ♂ 1 ♀ 20-x.

Phlegethontius rusticus cortesi subsp. nov. (Fig. 1.)

Specimens from Baja California are somewhat smaller than mainland specimens. Average fore wing length of Mexican *rusticus* (Fig. 2) is 130 mm., average fore wing length of *cortesi* 85 mm., though two of the series had a length of 110 mm. In comparing the series from the peninsula with specimens from the mainland, one is struck not only with the smaller size of Baja specimens, but especially with their pepper and salt black-and-white coloring, in strong contrast with the brown-and-white coloring of mainland specimens. In the West Indies *P. rusticus* is subject to insular subspeciation, with *P. r. cubanus* on Cuba, *P. r. dominicanus* on Hispanola and *P. r. harterti* in the Windward Islands. Thus although mainland specimens are *P. r. rusticus*, it is not surprising to find still another subspecies on Baja California.

Antennae brown with white above in mainland specimens, but grayish black with white above in those from Baja. In both they are set in white but the white is more extensive in *r. cortesi*, forming a narrow band on top of the head. Thorax of *cortesi* has much white mixed with dark gray, while the thorax of *r. rusticus* is uniform brown. Both have white where the wings join the thorax, but in *cortesi* there is a black line above the white. The white spots on the abdomen above are very bright on *cortesi*, but are missing in mainland specimens. Both forms have a dark medial line on the dorsum and the ventral side is white with five dark spots.

The white transverse area bounded by a black zigzag line at the apex of the fore wing in *cortesi* is much less clearly defined in *r. rusticus*. On the hind wing above, mainland specimens are almost solidly brown with two white lines basad at the anal angle. In *cortesi* there are three distinct white lines, the upper of which becomes a white spot at the anal angle, the median line runs from the costal to the inner margin; these two are barely indicated in *r. rusticus*, with only the third line at all clear.

Under side of fore wing grayish black in *cortesi*, uninterrupted brown in *r. rusticus* from the mainland. A clearly marked grayish white band with a blackish pointed line at each edge in *cortesi* extends from the costal to the inner margin; this marking is scarcely indicated in mainland specimens. The hind wings beneath in both subspecies have two curving lines with many points running from the costal around to the inner margin; in *cortesi* this is black on white, but in mainland *rusticus* it is brown on white, though giving a sharper contrast than in *cortesi*.

Fringes black with white spots; in *cortesi* the white spots are prominent, but in *rusticus* they are small and insignificant.

Male genitalia: Essentially similar to typical *rusticus*, but with some minor differences noted: the valve of *cortesi* (Fig. 12) is somewhat narrower and its



Fig. 1. *Phlegethontius rusticus cortesi* subsp. nov., holotype ♂, San José del Cabo, Baja California. Upper side (left), under side (right)

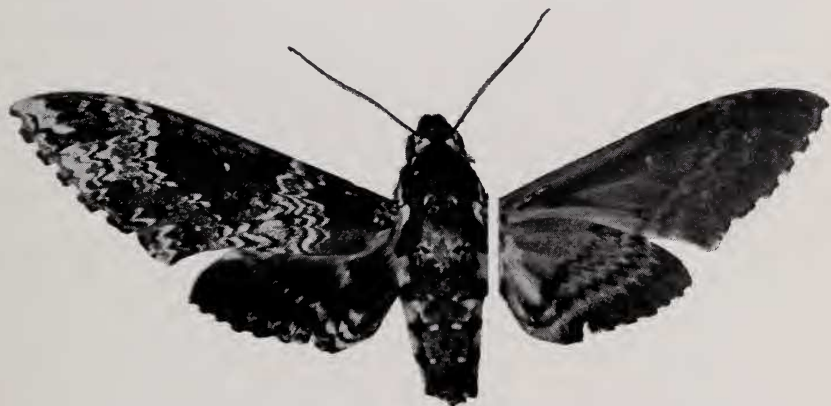


Fig. 2. *Phlegethontius rusticus rusticus* (Fabricius), male from Misantla, Mexico, in Carnegie Museum. Upper side (left), under side (right)

tip a little more acute; in *rusticus* (Fig. 13) the wider valve has a more rounded tip. The sclerotization at the base of the dorsal margin of the valve, near the articulation, forms an in-pointing angled tooth in typical *rustica*, but this structure is evenly curved in *cortesi*. Some differences in the little projection at the ventral inner side of the valve may be noted in the figure, but this was found not to be a consistent variation in all preparations.

Six ♂, 2 ♀, all taken in the ultra-violet light trap.

Holotype ♂, San José del Cabo, Baja California Sur, Mexico; 26 November 1961; (genitalia slide 965).

Paratypes: Rancho Palmarito, 1 ♂ 30-x (genitalia slide 964). Bahía de Palmas, 3 ♂ 1 ♀ 12-xi (♂ and ♀ in Cary collection). Puerto Chilena, 1 ♂ 24-xi, 1 ♀ 25-xi.

This subspecies is named for Hernando Cortes who landed at La Paz in 1535.

Sphinx merops Boisduval, 1870.

Two males were captured by the mainland party in Sinaloa. This species is tropical, distributed from Mexico to Ecuador, but was not taken on Baja California.

Sinaloa: Five miles west of Concordia, 2♂ 2-xi.

Sphinx xantus sp. nov. (Fig. 3.)

S. xantus is smaller than the closely related *Sphinx istar* Rothschild and Jordan (Fig. 4), found on the mainland of Mexico, having the fore wing 90 mm. long compared to an average of 125 mm. for *istar*. *S. xantus* is more somber brown than the lighter, rather more variegated *istar*. A strong pinkish tinge in the median area of the fore wing of *xantus* contrasts with a similar whitish gray area in *istar*. These are the most easily noted differences between the two species.

In both species the antennae are medium brown above, white beneath in fresh specimens, and the antennal setae are brown; the head beside the base of the antennae, the top of the head and the palpi are gray; eyes and surrounding area black with a strong black interrupted line extending from the palpi to the base of the wing beneath; thorax gray above lined with a heavy black streak edged white at the wing base. Abdomens similar above, but the black medial line is more clearly indicated in *xantus* because the background is lighter than in *istar*.

Fore wing of *xantus* with four distinct white spots on the costal margin, these indicated only faintly in *istar*. Apex more whitish in *xantus* and the three dark brown lines from the apex are marked more sharply in *xantus* than in *istar*. Disk much darker brown in *xantus* and contrasts much more than in *istar*. Inner margins are light gray in both.

Hind wing with a black marginal band proportionately wider in *xantus* and the black median line proportionately narrower. The white median band in *istar* is penetrated by black tooth-like lines which are not present in *xantus*.

On the under side the fore wing of *xantus* is gray black and has only very indistinct markings; in *istar* this surface is a light brownish gray and is quite clearly marked by two heavy brown lines with white suffusion distad curving from the costa to the inner margin.

Hind wing beneath is also much darker in *xantus*. The two dark brown lines from the costal to the inner margin have in *istar* teeth intruding into the white band; in *xantus* the bands are narrower, set closer together, and have fewer denticular intrusions into the white. The marginal blackish gray band is wider in *xantus* than in *istar*.

Fringes of both species are brown and white but are brighter in *istar*.

Male genitalia (Fig. 14-18): The most striking feature is the harpogne, which bears numerous teeth distributed along the whole of its dorsal margin and set rather closely. In *S. istar* there are fewer of these teeth; they are not so closely placed and are mostly confined to the posterior half of the dorsal margin, the anterior part being undulate rather than toothed. The penis of *xantus* is about 10% longer (the valve is 60% of penis length) than that of *istar* (where the valve is 70% of the penis length). Fig. 14 shows the entire genitalia of the holotype (slide 956); dentition of the harpogne of the holotype is shown in Fig. 15, of the paratype in Fig. 16 (slide 957), of two males of *istar* in Carnegie Museum from mainland Mexico in Fig. 17 and 18 (slides 958 and 959).



Fig. 3. *Sphinx xantus* sp. nov., holotype ♂, San José del Cabo, Baja California. Upper side (left), under side (right)



Fig. 4. *Sphinx istar* Rothschild and Jordan, male from Misantla, Mexico, in Carnegie Museum. Upper side (left), and under side (right)

Two ♂'s, 1 ♀, captured at ultra-violet light.

Holotype ♂, San José del Cabo, 26 November 1961 (genitalia slide 956).

Paratype ♂, San José del Cabo, 25 November 1961 (genitalia slide 957).

Paratype ♀, Bahía de Palmas, 27 November 1961.

This interesting species is named for Janos Xantus (1825-1894), a native of Budapest, who made collections at Cabo San Lucas, Baja California, from August 1859 through February 1860. His extensive material was studied and published a century ago by the Academy of Sciences of Philadelphia and by the Smithsonian Institution. It seems fitting to dedicate this species to one of the pioneer naturalists to explore the lower peninsula.

Smerinthus cerisy ophthalmica Boisduval, 1855.

It is most interesting to find that this southern California subspecies extends its range along the peninsula and that it appears to be commoner in the mountains. *S. c. saliciti* is found in Arizona and the Mexican highlands and with the series of *ophthalmica* taken by the expedition marks the southern limits of this characteristically temperate species.

Baja California Sur: Arroyo San Bartolo, 4 ♀ 1-xi (one in Cary collection). Arroyo San Bernardo, 500-600 meters above sea-level in Sierra de la Laguna, 6 ♀ 17-xi (three in Cary collection). Puerto Chileno, 1 ♀ 26-xi.

Pachysphinx modesta peninsularis subsp. nov. (Fig 5.)

This subspecies represents the other essentially temperate species found in Baja California. Draudt gives "Colorado, Sonora and Lower California" as the distribution of the very pale *P. m. kunzei* Rothschild and Jordan, on the strength of which we expected to find it on the peninsula. It was not taken, however, and all specimens of *kunzei* in Carnegie Museum are from the United States. Instead and to our surprise, we found that Baja California has an endemic subspecies hitherto unrecorded. The geographically adjacent subspecies of *modesta* are *m. regalis* (Fig. 6) of the Mexican mainland, and *m. imperator* (Fig. 7) from Arizona, New Mexico and southern California. Baja specimens are slightly smaller than either:

<i>P. modesta regalis</i>	140 mm.
<i>P. modesta imperator</i>	125 mm.
<i>P. modesta peninsularis</i>	120 mm.

The fore wings of *regalis* are reddish and clearly marked, those of *imperator* a light creamy tan, while in *peninsularis* the wings are darker, less clearly marked and of a more uniform grayish tan. The wide, light brown band crossing the middle of the fore wing from the costal to the inner margin is indicated only weakly in *peninsularis* by the darker brown, scalloped outer edge. In *regalis* and *imperator* this whole band is dark brown and the scalloped distal edging is wider, though not as dark. In *regalis* there is a sharp point from the light brown area near the base of the wing reaching into the dark brown stripe over the anal vein; this point in *peninsularis* is weak and only poorly indicated. In *peninsularis* and *regalis* the marginal band is light grayish brown, less distinct than in *imperator*. Near the base of the wing is a curving brown line from the costal to the inner margin, barely indicated in *peninsularis* but strongly marked in the other two.

The upper side of the hind wing in both *regalis* and *imperator* is largely a rosy pink, deeper at the base. In *peninsularis* this coloring is grayish magenta and reaches the outer margin where it is only slightly lightened; in *regalis* the pink is limited by a light creamy border. In the anal angle of *regalis* there are three dark streaks, the first two very plainly marked and the third indicated. In *imperator* there are only the two strong streaks. In *peninsularis* the middle of the three streaks is present, merging into a gray area which runs to the anal angle and in which is a very shadowy second line.

Except for a magenta wedge at the base of the fore wing, the under side of *peninsularis* is almost uniform tan with only a slightly darker band on the outer edge. The under side of *regalis* is rosy pink and the band on the outer edge is more distinct. The under side of *imperator* is quite light, fairly uniform in color and poorly marked, like that of *peninsularis*.

In summary, *imperator* from California is much lighter, *regalis* from mainland Mexico is more strongly marked. These features, along with the magenta coloring of the hind wing of *peninsularis* as compared to the rosy pink of both *regalis* and *imperator* distinguish the Baja California subspecies.

Holotype ♀ and 2 ♀ paratypes, San José del Cabo, 25 October 1961, (one paratype in Cary collection), all taken at ultra-violet light.

Erinnyis ello Linne, 1758.

This is another common, very widely distributed species found throughout the Americas.

Baja California Sur: Hotel Guaycura, La Paz, 1 ♀ 17-x, 1 ♀ 18-x, 7 ♂ 1 ♀ 20-x (1 ♂ in Cary collection) 3 ♂ 4 ♀ 21-x (1 ♀ in Cary collection), 2 ♂ 23-x,



Fig. 5. *Pachysphinx modesta peninsularis* subsp. nov., holotype ♀, San José del Cabo, Baja California. Upper side (left), under side (right)



Fig. 6. *Pachysphinx modesta regalis* Rothschild and Jordan, female from Mexico, in Carnegie Museum. Upper side



Fig. 7. *Pachysphinx modesta imperiator* Strecker, female from Los Angeles, California, in Carnegie Museum. Upper side

1 ♀ 24-x, 1 ♂ 1 ♀ 26-x, 1 ♀ 29-x, 1 ♀ 6-xi, 1 ♀ 7-xi, 1 ♂ 30-xi, 1 ♂ 3-xii. Bahía de Palmas, 1 ♂ 12-xi. Rancho San Bernardo, 1 ♀ 17-xi. San José del Cabo, 1 ♂ 2 ♀ 25-x. Puerto Chilena, 1 ♀ 22-xi, 1 ♂ 23-xi. All taken at ultra-violet light.

Sinaloa: Sonoyta, 1 ♀ 18-x at motel lights. Guaymas, 3 ♂ 5 ♀ 20-x at motel lights.

Erinnyis yucatanana Druce, 1888.

A tropical species found in Costa Rica to Mexico on the mainland, it was not taken on the peninsula.

Sinaloa: Flamingo Motel, Mazatlan, 2 ♀ 2-xi, at lights.

Erinnyis obscura Fabricius, 1775.

The series from Baja California entirely agrees with mainland specimens of this tropical species.

Baja California Sur: La Purisima, 1 ♂ 3-xii. Hotel Guaycura, La Paz, 2 ♀ 27-x (1 in Cary collection), 1 ♂ 31-x, 1 ♂ 5-xi 1 ♂ 6-xi, 1 ♂ 29-xi, 1 ♂ 30-xi (Cary collection), 1 ♂ 3-xii. Bahía de Palmas, 1 ♂ 17-xi, 1 ♂ 27-xi. San José del Cabo, 1 ♀ 25-x.

Pachylia syces Hübner, 1822.

The sole specimen taken is typical. The species occurs almost everywhere in the American tropics.

Baja California Sur: Bahía de Palmas, 1 ♀ 12-xi.

Hemeroplanes parce parce Fabricius, 1775.

This pretty little species is found throughout the tropics. Typical specimens were taken by the mainland party in Mazatlan, but the excellent series from the peninsula proves to be a distinct subspecies apparently endemic to Baja California Sur.

Sinaloa: Flamingo Motel, Mazatlan, 1 ♂ 29-x, at lights. 18 miles north of Mazatlan, 8 ♂ 1 ♀ 2-xi, at ultra-violet light (1 ♂ in Cary collection).

Hemeroplanes parce guaycura subsp. nov. (Fig. 8, 9.)

Slightly smaller than *H. p. parce* (Fig. 10, 11) the fore wing measures 55 to 60 mm. compared to 65 mm. average for typical specimens. The ground color of *guaycura* is a very light tan irrorated with darker brown and some white. Some of the 118 specimens in the type series are a little darker than average but in no case is there any trace of the rich, dark reddish brown so characteristic of *p. parce*.

The body differs little from that of *p. parce*, both having the lappets a darker brown and both having three darker triangles on the dorsal side of the abdomen.

Apex of the fore wing slightly more extended in *guaycura*. The curving white line terminating in the apex is less prominent because it lies in a much lighter ground color. The light dot at the base of the wing above is silvery in *parce* but flat white in *guaycura*. The silver discal spot and the watered lines near the costal margin are identically shaped in both subspecies.

The hind wing is more sharply indented at the anal angle in *guaycura*, but is marked and colored the same in both forms except that the bluish white lines in the dark spot near the anal angle tend to be stronger and cleaner in *guaycura*.

Beneath the markings are similar in the two subspecies, but whereas the ground color in *parce* is blackish brown blending into orange red at the bases of the wings, in *guaycura* the ground is light tan and the undulating rows of black dots crossing the wings are much less prominent, and not so deep black in color.

Male genitalia: Very similar to *p. parce*, as would be expected of subspecies, with only minor differences. Gnathos one-fifth the length of the tegumen plus uncus, but in *parce* it is one-fourth.

Seventy ♂, 53 ♀ all taken at ultra-violet light.

Holotype ♂, Hotel Guaycura, La Paz, Baja California Sur, 10-xi (genitalia slide 961).

Paratypes, all Baja California Sur: Hotel Guaycura, La Paz, 5 ♂ 2 ♀ 20-x (2 ♂ in Cary collection), 6 ♂ 5 ♀ 21-x, 2 ♂ 3 ♀ 22-x, 2 ♂ 2 ♀ 23-x (1 ♀ in Cary collection), 6 ♂ 4 ♀ 26-x (1 ♂ in Cary collection), 5 ♂ 2 ♀ 27-x, 4 ♂ 1 ♀ 28-x



Fig. 8. *Hemeroplanes parce guaycura* subsp. nov., holotype ♂, La Paz, Baja California. Upper side

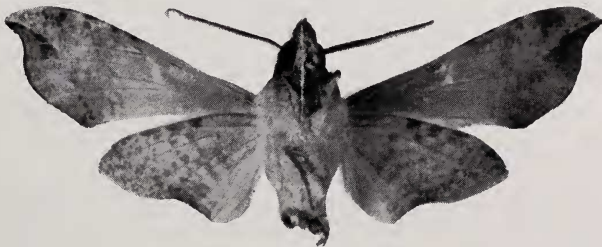


Fig. 9. *Hemeroplanes parce guaycura*. Same as Fig. 8. Under side



Fig. 10. *Hemeroplanes parce parce* (Fabricius), male, near Concordia, Sinaloa, Mexico, in Carnegie Museum. Upper side

(2♂ in Cary collection), 1♂ 1♀ 29-x (♂ in Cary collection), 3♂ 4♀ 21-x, 3♂ 2♀ 3-xi, 1♂ 3♀ 5-xi, 3♀ 6-xi, 7♂ 3♀ 7-xi, 2♂ 8-xi (1♂ in Cary collection), 2♂ 1♀ 9-xi, 1♂ 10-xi, 3♂ 2♀ 29-xi, 3♀ 3-xii, 2♂ 3♀ 4-xii (1♂ in Cary collection), 3♂ 2♀ 5-xii, 3♀ 6-xii. Bahía de Palmas, 1♂ 1♀ 24-x, 1♂ 12-xi, 1♂ 17-xi, 1♀ 20-xi, 2♂ 27-xi. Rancho Palmarito, 1♂ 30-xi (genitalia slide 960), 1♂ 1♀ 3-xii. San José del Cabo, 1♂ 26-xi. La Purísima, 3♂ 3-xii (genitalia slide 962). Total: 70♂, 53♀.



Fig. 11. *Hemeroplanes parce parce* (Fabricius). Same as Fig. 10. Under side

The lovely hotel in La Paz where the expedition made its principal headquarters, the site of a great deal of the light-trap work, is named after an extinct Indian tribe, the Guaycura, who once lived on the peninsula, and I follow in naming this attractive moth.

Cautethia spuria Boisduval, 1875.

This tropical species is known only from mainland Mexico; it was not taken on the peninsula.

Sinaloa: Sixteen miles north of Mazatlan, 2 ♀ 28-x, at ultra-violet light.

Pholus vitis Linne, 1758.

A typical neotropical species, it was not unexpected to find it on Baja California.

Baja California: Hotel Guaycura, La Paz, 1 ♂ 18-x. Rancho Palmarito, 1 ♀ 30-x. Arroyo San Bartolo, 1 ♀ 1-xi, 1 ♀ 15-xi (in Cary collection). Bahía de Palmas, 1 ♀ 24-x, 2 ♀ 27-xi. Rancho Agua Blanco, 1 ♀ 14-xi. San José del Cabo, 1 ♂ 25-x. Puerto Chilena, 2 ♂ 26-xi (1 in Cary collection).

Pholus fasciatus Sulzer, 1776.

It is surprising that only a single female of this common species, distributed from Canada to Patagonia, was taken. Probably it flies on the peninsula earlier in the season.

Baja California: San José del Cabo, 1 ♀ 25-x.

Xlyophanes tersa Linne, 1771.

A "universal" species, found from Canada to Argentina with no geographic variation. It occurs also on the peninsula.

Baja California: Hotel Guaycura, La Paz, 1 ♀ 1-xii. Arroyo San Bartolo, 1 ♀ 1-xi, 1 ♀ 13-xi. Bahía de Palmas, 1 ♀ 24-x. Puerto Chilena, 1 ♀ 22-xi.

Celerio lineata Fabricius, 1775.

This is found almost everywhere in both the New and the Old World.

Baja California: Hotel Guaycura, La Paz, 1 ♀ 20-x, 3 ♂ 2 ♀ 21-x, 1 ♀ 22-x, 2 ♀ 23-x, 1 ♂ 26-x, 1 ♀ 28-x. Rancho Palmarito, 1 ♀ 3-xii. Bahía de Palmas, 1 ♂ 3 ♀ 24-x, 1 ♂ 17-xi, 1 ♂ 27-xi. San José del Cabo, 3 ♀ 25-x, 1 ♀ 23-xi. Puerto Chilena, 2 ♀ 24-xi.

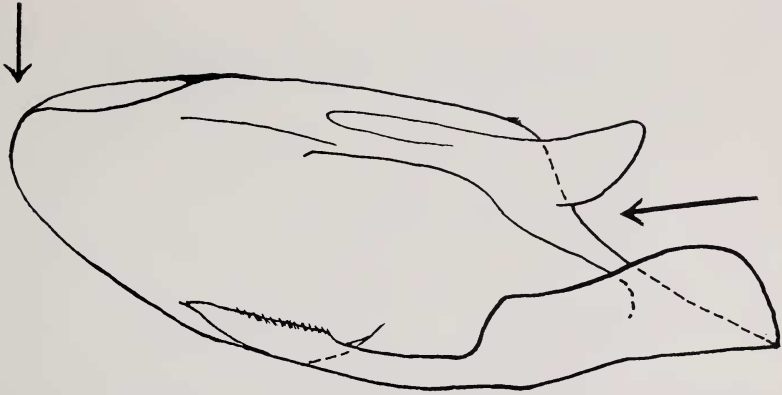


Fig. 12. Dissected valve of holotype ♂, *Phlegethontius rusticus cortesi* subsp. nov.

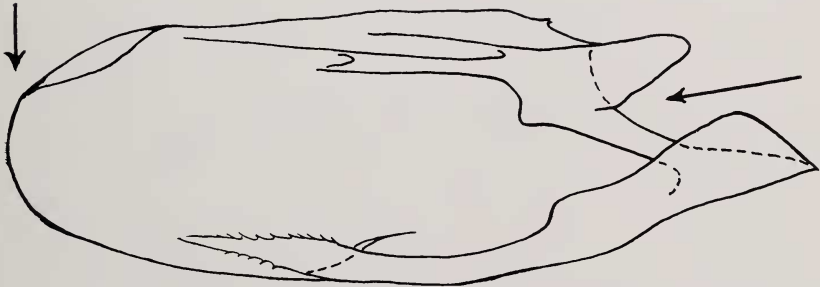


Fig. 13. Dissected valve of male *Phlegontius rusticus rusticus*

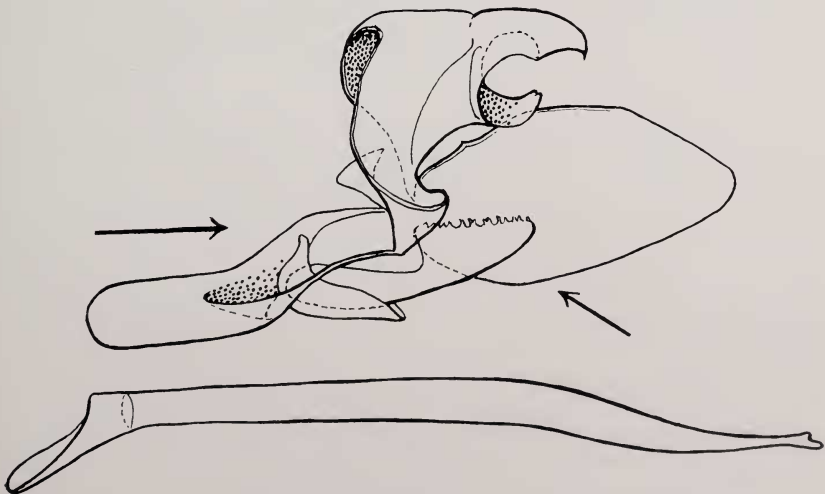


Fig. 14. Genitalia of holotype ♂, *Sphinx xantus* sp. nov.

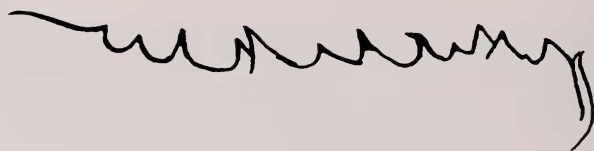


Fig. 15. Dentition at margin of harpogne, holotype δ , *Sphinx xantus*, enlarged

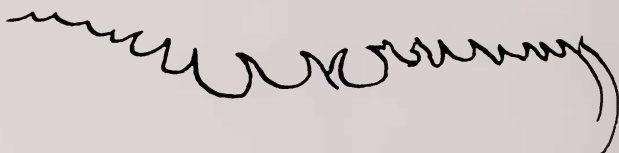


Fig. 16. Dentition at margin of harpogne, paratype δ , *Sphinx xantus*, enlarged

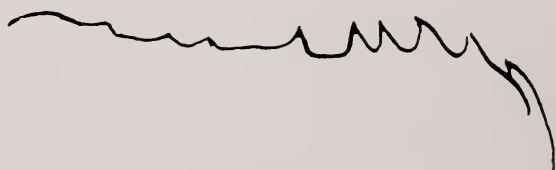


Fig. 17. Dentition at margin of harpogne, a male *Sphinx istar*, enlarged



Fig. 18. Dentition at margin of harpogne, another male *Sphinx istar*, enlarged